

Non-cancer Risk Formula (with volatilization factor):

$$Cs = [(THQ * BWc * AT) / (ED * EF * ((1/RfDo * RAFo * CF * IRSc) + (1/RfDi * IRAc * (1/PEF + 1/VF)) + (1/RfDo * CF * RAFd * DFc)))$$

C5-C8 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	41
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, November 2003)	4.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS January 2007 - n-hexane)	2.00E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	1419
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	1
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

C9-C12 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	92
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, November 2003)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, November 2003)	5.70E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	8563
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.5
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

NAPHTHALENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	10
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS January 2007)	2.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	8.60E-04
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	48405
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

C9-C18 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	153
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, November 2003)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, November 2003)	5.70E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	17605
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.5
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

ANTHRACENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	2,073
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	3.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	782038
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

ACENAPHTHENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	376
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	6.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	202974
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

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FLUORENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	269
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	4.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	452267
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

MTBE	
Parameters	Values
Cs (Soil concentration - mg/kg)	257
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; EPAIX, October 2002)	3.30E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	8.57E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	6018
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.0005
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

TOLUENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	475
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	8.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	1.43E+00
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	3971
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

ETHYLBENZENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	237
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	2.86E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	4601
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

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XYLENES	
Parameters	Values
Cs (Soil concentration - mg/kg)	30
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, January 2007)	2.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	2.90E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
VF (Volatilization factor - m^3/kg; EPA, May 1996)	4302
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

Non-cancer Risk Formula (without volatilization factor):

$$Cs = [(THQ * BWc * AT) / (ED * EF * ((1/RfDo * CF * IRSc) + (1/RfDo * IRAc * 1/PEF) + (1/RfDo * CF * RAFd * DFc)))]$$

C19-C36 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	15,276
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, November 2003)	2.00E+00
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.1
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

C9-C10 AROMATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	122
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS January 2007)	3.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, January 2007)	1.40E-02
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.5
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

C11-C22 AROMATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	458
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, November 2003)	3.00E-02
RAFo (Chemical specific oral relative absorption factor - unitless, MADEP, October 2002)	3.6E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, November 2003)	1.40E-02
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.1
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

FLUORANTHENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	287
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS January 2007)	4.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560

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PYRENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	215
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS January 2007)	3.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	8
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPA, July 2004)	0.13
DFc (Child dermal factor - mg/day; EPA, July 2004)	560